2023 WATER BODIES ASSESSMENT AND RECOMMENDATION REPORT

ARLINGTON CONSERVATION COMMISSION

MARCH 2024

Volunteer Water Chestnut Harvesting at the Res (July 8, 2023, photo by Daria Clark)

PUBLIC VERSION - 3/14/24

2023 ANALYSIS

The Arlington Conservation Commission (ACC), through its Water Bodies Working Group (WBWG), continued the assessment of water bodies in the Town of Arlington, which include five lakes and ponds and nine streams. A majority of these are negatively impacted by polluted runoff and stormwater discharges due to the highly urban nature of Arlington and surrounding towns. Most of these water bodies also have excessive aquatic invasive plants that degrade water quality, impede recreational use, and degrade aesthetics. In determining which water bodies could benefit from management measures using Town funding, the WBWG considered the following factors:

1. Water bodies that are in generally good shape, do not need much help, or whose issues are being addressed by other agencies or funding sources, e.g., Upper & Lower Mystic Lakes and Mystic River
2. Water bodies with some issues that could benefit from directed intervention, e.g. Spy Pond, Arlington Reservoir, Hills Pond, McClennen Park Detention Ponds (Reeds Brook)
3. Water bodies that are in poor shape with many issues that would need major efforts and additional funding to improve, e.g. Mill Brook and Alewife Brook.

Though the chemical treatments of several water bodies must continue for the coming year to control aquatic invasives and harmful algal blooms, the WBWG is focused on obtaining the appropriate data to develop comprehensive proactive management plans for Spy Pond, Arlington Reservoir, and Hills Pond. Our goal is to develop management plans where chemical use is only one step in concert with strategies to reduce nutrient inputs to the water bodies, remove and manage the spread of aquatic invasives through non-chemical means, and investigate opportunities to restore native aquatic plant communities.

Also a number of water bodies in Arlington (Spy Pond, Hills Pond, Mill Brook, Alewife Brook and the Mystic Lakes) are considered impaired by the Massachusetts Department of Environmental Protection (MADEP) and are included in the town's Stormwater Management Plan managed by the Arlington Department of Public Works (DPW). The focus of this program is to reduce nutrient loadings that can detrimentally affect water quality. There are a number of ongoing projects to improve the water quality of those resources.

Excessive nutrients are the primary cause of poor water body health. They lead to excessive algal growth, harmful cyanobacterial blooms and reduced oxygen content for aquatic life. The primary nutrient of concern in urban areas is Phosphorous, generally associated with stormwater runoff.

Management Goals

This year the water bodies working group also made a start on identifying management objectives for Arlington's water bodies. We have structured this as public goals and management goals, with specific management actions then created appropriated to each water body. We discuss later in this report the draft goals developed for Spy Pond.

A) Overall Public Goals

1. Open water environment for general enjoyment, boating and fishing
2. Healthy for native aquatic vegetation and organisms including fish and wildlife

B) Management Goals

1. Control of invasive aquatic plants and hazardous algae
2. Control/management of excessive nutrients
3. Minimize use of chemicals harmful to native plants and wildlife

C) Management Actions

1. Regular monitoring of conditions
2. Specific goals to be determined for each water body …

Based on the 2023 experiences, the WBWG has identified the following priority locations for 2024.

ARLINGTON RESERVOIR

Arlington Reservoir is a Town-owned water body on the Arlington-Lexington border with invasive water chestnut plants that form dense, impenetrable mats at the water's surface, which impair public use and water quality. These plants have been harvested mechanically every summer for many years.

For more cost-effective invasive management at the Arlington Reservoir, a new vendor was contracted to handle the mechanical removal of invasive water chestnuts. The job was accomplished earlier this year by a new contractor New England Aquatics. However funding was not available to clear the entire Reservoir and parts of the northern areas in Lexington were left undone. The water surface was clear where the harvesting had been done.

However as time went on new water chestnut plants started to appear on the surface as they grew up from the seeds on the bottom. Volunteers organized by the Reservoir Committee and the Mystic River Watershed Association (MyRWA) continued throughout the summer with hand harvesting from canoes. Altogether there were 11 harvesting events with over 200 volunteers who collected over 1000 baskets of plants. These efforts kept most of the southern water area open and usable and cut down on seed production for future growth.

Controlling water chestnuts is a long term process because these are annual plants which grow each year from seeds. However those seeds can remain viable in the sediments for many years. So it's important to remove as much of the new seed producing growth as possible each year. If a complete job is not done then one can keep harvesting new plants indefinitely. It's worth noting here that MyRWA has been harvesting water chestnut plants on the Mystic River for years and have now reached the point where fewer volunteers are required for that effort - which means more people are available now for the Res.

Patrick Herron the Director of MyRWA has this to say about water chestnut harvesting: *"Perhaps typical of invasive plants in general - 1/2 measures are of almost no value. Yes, harvesting 25% of water chestnut feels good and removes a certain amount of nutrients...but ultimately does nothing to reduce the future population. 75% of the remaining population will produce enough seeds to fill the area back up in the following year. If you can clear 100% of the plants for 4 years straight, you can bring your cost to 10% of the original cost and then gradually go lower and lower as you draw down on that seed bank in the sediment that may yield new plants for the next 15 years."*

Volunteers hand harvesting water chestnuts at the Reservoir

Our recommendation is for complete mechanical harvesting of the water chestnuts at the Res, to be supplemented by volunteer efforts. Mechanical harvesting in recent years has only been partial because of limited funding. If a more complete job can be done then we will likely see a reduction in plant growth and lower costs. One possibility to manage the costs of this is for the Town to purchase a harvester and run it themselves to complete the job. It might even be leased to other communities to cover the costs. Some explorations of this option were started last year and should be pursued.

The ACC is reviewing options for Reservoir management and may recommend additional actions beyond mechanical water chestnut harvesting.

The Reservoir, despite invasive plants, continues to be a healthy environment for fish, turtles, muskrats and many birds. It is also a popular birding spot in Arlington with the most observed species.

<u>Recommendations/Priorities for 2024</u>

- Arrange for a timely and complete mechanical harvesting of water chestnuts and continue to support the hand harvesting efforts.
- Consider expanding water chestnut harvesting to the entire water body to improve control of this invasive species.
- Investigate alternatives to hiring a contractor, including the possible town purchase of a mechanical harvester, to allow for more timely aquatic invasive control for this water body as well as others in town that may benefit from this management technique.

HILL'S POND

Water & Wetland was contracted to manage Hill's Pond in the heavily used Menotomy Rocks Park, which suffers from water quality and invasive plant problems. A major contributor to the problems are Phosphorus nutrients from runoff with fertilizers and animal waste. Actions were taken this year to measure and control those nutrients. The maintenance regime was moderately successful through the summer months. Hill's Pond was closed due to a harmful algal bloom (HAB) in July and early August, which was quickly addressed in collaboration with the Health Department. The WBWG will continue to regularly test the pond for harmful algae to help prevent closures due to blooms in 2024.

The Conservation Commission recommends continuing aeration, strictly limiting polluting activities near the pond or in areas that drain into the pond, maintaining a no-mow vegetated buffer strip around the pond four to ten feet wide of grass or natural vegetation, and low-dose chemical treatments with aquatic herbicides to control algae and other detrimental water plants. Monthly site visits with proactive treatments through the summer of 2023 proved successful in reducing invasives.

Recommendations/Priorities for 2024

- Monitor and investigate options for maintaining a healthier water body, including maintenance of four aeration pumps and establishing a no-mow buffer strip around the pond.
- Consider possible measures to reduce Phosphorus nutrient levels.
- Update permitting for next three years of treatment.
- Regularly test for the presence of cyanobacteria.

MILL BROOK

Mill Brook water quality grade moved down from D+ to D in 2022 (EPA/MyRWA Water Quality Report: https://mysticriver.org/epa-grade/[1]). Mill Brook's poor water quality is basically due to stormwater runoff; however, the possibility of illicit discharges are also being investigated by the Department of Public Works (DPW). Where not channelized, the brook and its adjacent shore provide valuable wildlife habitat and opportunities for nature views.

Recent work in Wellington Park to create more flood storage and improve habitat value in Mill Brook was completed in 2022 and maintenance of this area is being undertaken by DPW. Future projects that will improve Mill Brook's resource area values include a redesign of Cooke's Hollow and Meadowbrook Park and possible bank and channel restoration work between Hurd Field and the Reservoir.

The current 40B project underway at the Mirak-Schwamb Mill site will add public access and more natural vegetated areas along the brook. The additional 40B project permitted in 2023 at 1021-1025 Massachusetts Avenue will create an urban forest within the riverfront area of Mill Brook and enhance the riparian habitat adjacent to the brook at this location.

[1] The water quality grades are based solely on Coliform bacteria counts and do not consider other factors.

CPA funds were used to perform a feasibility study of Cooke's Hollow in 2023 for restoration and public access of this conservation area adjacent to Mill Brook.

A CPA grant was awarded for two feasibility studies and preliminary design concepts for Mill Brook and No Name Brook, which runs alongside the Minuteman Bikeway. The specific location for the CPA project is in the upper reach of the brook near Arlington Reservoir. The principal goal is to identify and design bank stabilization interventions using green infrastructure, which will improve habitat, water quality, and climate resilience.

Recommendations/Priorities for 2024

- Pursue restoration of Mill Brook between the Reservoir and Hurd Field with CPA funds sought for FY2024.
- Continue to support the redesign of Cooke's Hollow, continue support for Mill Brook/No Name Brook CPA project, and pursue funding for redesign of Meadowbrook Park.
- Evaluate ways to minimize stormwater runoff contaminants.

McCLENNEN PARK DETENTION PONDS ON REEDS BROOK

Residents abutting the detention ponds approached the Department of Planning and Community Development (DPCD) to discuss flooding concerns and the lack of maintenance of the detention ponds. DPCD determined that the preliminary monitoring period, which was meant to establish routine maintenance, was never conducted. The ponds require a new survey to determine how existing conditions differ from the design, and possible work to return to design conditions, to be followed by the established monitoring period. DPCD submitted a CPA application for the survey in 2023. If awarded, the funds will pay for a survey in 2024.

In 2023, the ACC worked with the Park and Recreation Commission and the Department of Public Works to reestablish a vegetated buffer strip around the ponds to control runoff and to improve wildlife habitat. Signage for the no-mow zone will be sought in 2024

Recommendations/Priorities for 2024

- Establish signage indicating the buffer zone and no-mow area around the detention ponds.
- Investigate sedimentation issues and follow up on DPW maintenance activities.

SPY POND

Spy Pond is a 103 acre kettle hole pond in East Arlington. Its northeastern shore features Spy Pond Park, Boys and Girls Club, and Scannell Field. Spy Pond is a popular destination for walking, birding, picnics, fishing, boating, rowing, and sailing. It is one of Arlington's most heavily used open spaces for recreation. Left untreated, invasive plants impair recreational use.

Spy Pond has invasive plant problems - both in the water and along the shores. The land surrounding the pond is mostly managed landscape. Runoff from this land combined with stormwater outlets and thick sediment beds contribute to nutrient loading and low oxygen levels.

From a water body management perspective there are many issues associated with Spy Pond.

1. **Invasive Aquatic Plants**
   The invasive plants of primary concern are curly-leaf pondweed, Eurasian watermilfoil, and brittle naiad. These plants can cover the water surface and impair aquatic activities. Early proactive treatment when the plants are just emerging is best (April-May, June-July for brittle naiad) to kill the plants. In some years this treatment has happened too late and also wiped out the native plants.
2. **Harmful Algae Blooms (HAB)**
   In some years excessive nutrients and other factors can result in harmful algae blooms (HAB) that close the pond to public use. This needs regular monitoring and timely treatment with an algaecide..
3. **Excessive nutrients**
   The pond has excessive nutrients - especially phosphorus from sediments and stormwater runoff that discharges into the pond. Chemical control with alum that binds to the nutrients and settles to the bottom has been used in the past. A wetland area is an alternative approach but there are few locations along the shore for such a feature.
4. **Lack of native aquatic plants**
   The combination of invasive plants and the chemical herbicide treatments have pretty much eliminated any native aquatic plants. We are looking into restocking with native plants from other sources.
5. **Protected species along the shore**
   An endangered plant species Engelmann’s Flatsedge grows along the shore of the pond and special precautions and a plant survey have to be conducted before using any herbicide on the aquatic plants. This is an additional requirement and cost for the pond management.
6. **Shoreline problems**
   There are both shoreline erosion problems and invasive plants growing along the shore. The most troublesome plants are Phragmites which unless controlled will expand to cover more of the shoreline. This has been treated in the past but has reappeared and requires further control most likely with a herbicide whose use will need to be carefully monitored..

All of these factors complicate and increase the expense of managing Spy Pond

Recent Activities

The Conservation Commission contracted with SWCA Environmental Consultants (SWCA) and their subcontractor Water & Wetland (W&W)) for management of Spy Pond, including an assessment of the state of its aquatic vegetation. Spy Pond was effectively treated for curly-leaf pondweed in May. The treatment may have removed a new infestation of Eurasian watermilfoil that was found in September 2022. No water chestnut plants were found this year.

Parterre Ecological removed invasives and added native plants along the shoreline of Spy Pond Park. The Parks and Recreation Department used Community Preservation Funding to renovate the playground with updated and handicapped accessible equipment and access by creating: a pervious surface for the handicapped ramp leading to the water's edge near the park entrance, and completing a pond overlook near Linwood Circle at the other end of the park. The DPW did a major cleanup of debris at the Linwood Beach shoreline.

Volunteers planted native bushes for Spy Pond Park Work Days

Extensive volunteer efforts have focused on water body health: The Friends of Spy Pond Park treated and removed invasives and planted new native shrubs and trees in the park shoreline planting beds. Other efforts involved: planting new dogwoods and removing invasives for the path between Rt. 2 and Spy Pond, and distributing 3,400 fertilizer flyers to Arlington households.

Recommendations/Priorities for 2024

- Develop a comprehensive long-term management plan for Spy Pond.
- Closely monitor the pond to ensure timely treatments before problems occur.
- Investigate the introduction of native aquatic plants back into the pond.
- Treat the expanding population of phragmites on Elizabeth Island and other locations.
- Facilitate shoreline stabilization work to ensure water quality of the pond.

ALEWIFE BROOK

This stream runs along the eastern border of Arlington in the DCR Alewife Greenway Reservation. This area includes pedestrian and bicycle paths from the Alewife T station in Cambridge up to the Mystic River in Medford. The greenway also includes many native plants and provides a wildlife habitat, but also has many invasive plants as well. The water quality of Alewife Brook in 2022 remained at a D grade (https://mysticriver.org/epa-grade/.

Much of Alewife Brook's poor water quality is due to stormwater runoff, but the area also hosts Combined Sewer Outfalls (CSO) which release untreated sewage into the brook from Cambridge and Somerville in moderate to large storm events. Other contributing factors are contamination from the upstream Little River and the collected sediments in the brook itself. That creates further problems during flood events when sewage contaminated water can overtop the brook and flow onto adjacent properties in the floodplain. Approximately 5,000 people live in the 100 year floodplain. This is a problem which requires a regional solution involving the adjacent towns and the state. A local activist group Save the Alewife Brook (StAB) was formed in 2021 to address these issues (https://savethealewifebrook.org/). The Arlington Select Board has been active in pushing for solutions.

In 2023 which was a fairly rainy year, there were over a dozen CSO sewage discharges into Alewife Brook. There were also three occasions when these discharges coincided with flooding of the Alewife Greenway path. With the support of local state representatives $100,000 has been allocated in the state budget to assess sediments in the Alewife Brook and what might be done about them. This grant is being managed by the Mystic River Watershed Association.

The parties responsible for the CSOs along the Alewife Brook are the Cities of Cambridge and Somerville, and the Massachusetts Water Resources Authority (MWRA). (Arlington has a totally separated sewer system and thus no CSOs.) These parties are involved in a regulatory process with the Massachusetts Department of Environmental Protection (MA DEP) to develop a new Long Term Control Plan (LTCP) for Alewife Brook. It is expected that this will result in water quality improvements and hopefully the closure or treatment of the remaining CSOs. There have been a number of public meetings regarding the development of the new long-term control plan. The public is encouraged to participate in this process. Information can be found at the MWRA https://www.mwra.com/03sewer/html/sewcso.htm , Cambridge https://www.cambridgema.gov/Departments/publicworks/cityprojects/2022/updatedcombinedseweroverflowcsocontrolplan and Somerville https://www.somervillema.gov/cso websites.

Joggers, walkers and strollers go through sewage contaminated water on the Alewife Brook Greenway, Aug 11, 2024. Photo by David Stoff of Save the Alewife Brook.

Recommendations/Priorities for 2024

- Implement green stormwater structures in East Arlington with the assistance of a $40,000 earmark grant from DCR. (See also the Mystic River section below.)
- Work with DPW in implementing measures to improve stormwater runoff.
- Support efforts for a new CSO Long Term Control plan that eliminates untreated CSO discharges into the brook.

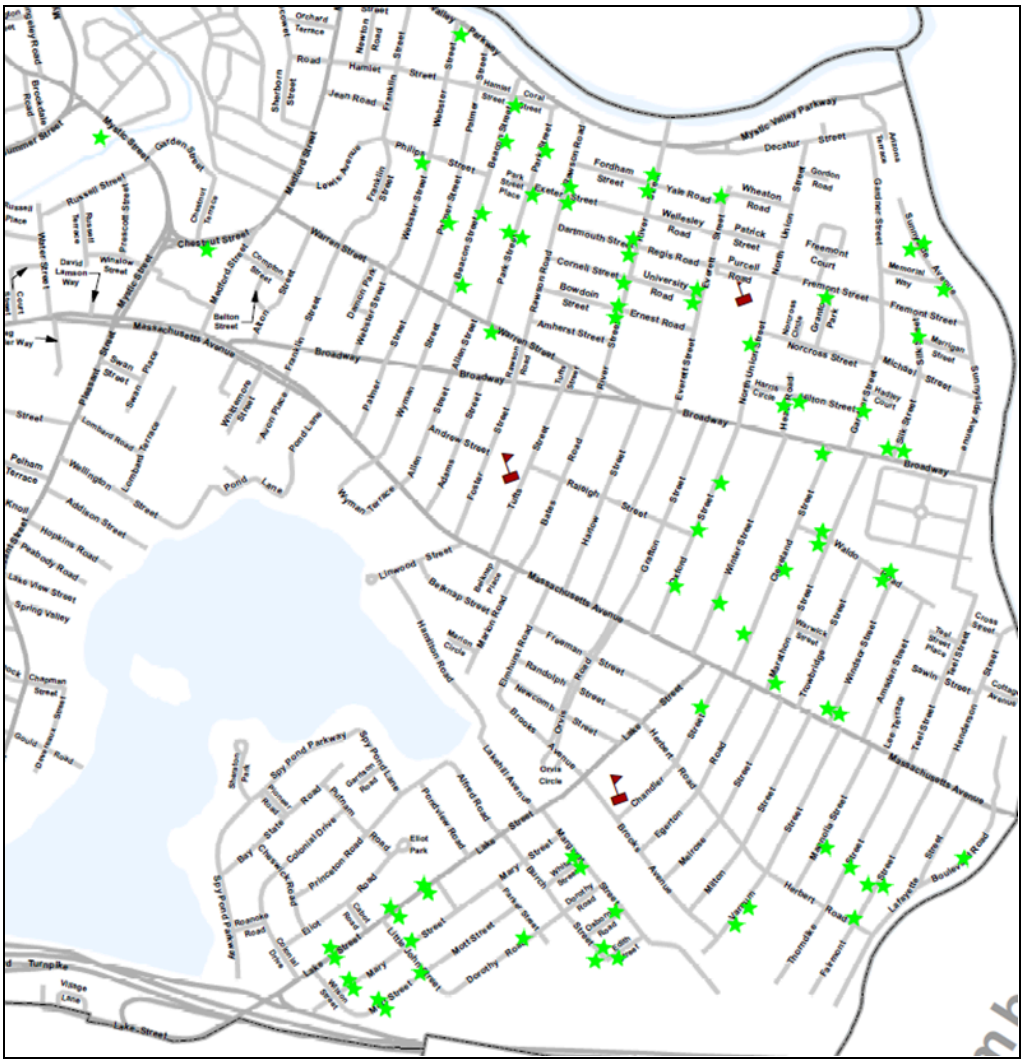
MYSTIC RIVER

On-the-ground improvements to the Mystic River water quality are led primarily by Mystic River Watershed Association and other volunteer groups. The EPA water quality grading of "B" for the Mystic River in 2022 was a slight decrease from "B+" in prior years (https://www.epa.gov/mysticriver/mystic-river-watershed-report-cards). The grades are calculated based solely on the percentage of days that bacteria levels at each of the sampling sites meet Massachusetts Department of Environmental Protection (DEP) water quality standards for swimming and boating. The "B" grade means that the Mystic River was in compliance with DEP standards 75-80% of the time.

Monitoring of the completed Mystic Riverfront Restoration Project continued in 2023 with invasive plants control along the river managed by Arlington DPW, based on The Memorandum of Agreement between DCR and the Town (2021) allowing that this restored riparian habitat and swale can be maintained into the future. The restoration withstood extreme rainfall events in 2023 and worked as designed to provide additional flood storage capacity and improved water quality by infiltration of stormwater through the swale, coupled with improvements implemented by Arlington DPW upstream of the outfall to increase capacity to capture and infiltrate stormwater.

Over the years, Arlington's DPW has taken a watershed approach to improve contributing stormwater quality by installing green infrastructure, such as rain gardens and infiltration trenches. Rain gardens and infiltration trenches have been constructed in East Arlington to filter pollutants out of stormwater before its discharge to the Mystic River and Alewife Brook.

This work is managed by the DPW and has in past years been funded through Section 604b Water Quality Management Grants and Section 319 Nonpoint Source Grants from the Massachusetts Department of Environmental Protection (MassDEP), as well as Coastal Pollutant Remediation Grants from the Office of Coastal Zone Management (CZM). Since 2018, the DPW has installed eighty-eight (88) infiltration trenches which are shown in the graphic below. To date, all trenches have been installed in East Arlington due to the optimal soil conditions present in that section of Town. These efforts lead the Town of Arlington to be recognized in May 2023 as the winner of the "2022 New England Stormy Award" by the New England Stormwater Collaborative.



Locations of infiltration trenches installed by DPW from 2018 to 2023

The DPW planned to complete additional infiltration trench installations in 2023 via MassDEP's 319 program but the release of funding was ultimately delayed. The DPW now projects that approximately thirty (30) additional trenches will instead be installed in 2024 barring any unforeseen circumstances. These additions will reduce the amount of pollutants entering Alewife Brook and the Mystic River and help the Town maintain compliance with the MS4 General Permit ("stormwater permit") issued to the Town by the United States Environmental Protection Agency (USEPA).

<u>Recommendations/Priorities for 2024</u>

- Continue to support DPW in implementing measures to improve stormwater runoff, which has a significant impact on water quality in these locations.

CONCLUSIONS

The Water Bodies Working Group has collected information for all the water bodies evaluated in support of this report. All water body recommendations for actions and funding will be reviewed on an annual basis.

It has been challenging to manage our town water bodies in times of extreme weather and we have increasingly been faced with harmful algal blooms (Spy Pond, Hills Pond, Reservoir), flooding (Mill Brook, Alewife Brook), and the impact of CSOs (Alewife Brook). The WBWG is focused on continued monitoring and improvement of aquatic management to minimize these negative effects and improve these water bodies for the enjoyment of the community and the health of the environment.

We would like to thank everyone who has been involved in caring for Arlington's water bodies including the Spy Pond Committee, Friends of Spy Pond, Friends of Menotomy Rocks Park, the Reservoir Committee, the Department of Public Works, the Park and Recreation Commission, the Mystic River Watershed Association, and many others.

NEXT STEPS & RECOMMENDATIONS

The individual actions and priorities are described above in the sections for each water body.

FUNDING

This work is made possible by the Water Bodies Fund which is supported by the Town. Detailed financial information is found in the budget which is submitted to the Finance Committee and the Town Meeting each year.

Respectfully Submitted by:

Water Bodies Working Group of the Arlington Conservation Commission:

Brad Barber, Spy Pond Committee
David Kaplan, Conservation Commissioner
Ellen Reed, Friends of Menotomy Rocks Park
Natasha Waden, Health Department
Carolyn White, Finance Committee
David White, Conservation Commissioner and Reservoir Committee
David Morgan, Conservation Agent

The WBWG thanks David Morgan, Conservation Agent, for his assistance in preparing this report and also thanks for contributions from Brad Barber, Ellen Reed, and Susan Chapnick.

We also thank the Department of Public Works both for contributions to this report and their efforts in protecting Arlington's water resources.

Addendum - Spy Pond Management Goals

Below are listed the various Goals as received from the Arlington Conservation Commission (ACC) and a listing of activities conducted by the Spy Pond Committee (SPC) in furtherance of the goals. Most of the Spy Pond Committee activities can be carried on independently (e.g. fertilizer flyer distribution, plantings along Route 2 bank) but others require coordination or at least communication with the Conservation Commission. The latter are marked with an asterisk below.

Received From the Conservation Commission:

A) Overall Public Goals

1. Open water environment for general enjoyment, boating and fishing

2. Healthy for fish and wildlife

B) Management Goals

1. Control of invasive aquatic plants and hazardous algae

2. Control/management of excessive nutrients

3. Minimize use of chemicals harmful to native plants and wildlife

C) Management Actions (for Spy Pond)

1. Regular monitoring of conditions.

2. Maintain target water level at 40-42 cm (to be reviewed).

3. Enhance aquatic native plant populations, investigate re-vegetation with native species.

4. Control detrimental invasive plants with chemical or mechanical means

5. Minimal use of chemicals so as not to affect fish, wildlife and native plants.

6. Edge runoff and vegetation control

Spy Pond Committee Actions and activities

1. * Promote best solutions for managing water quality, invasive plants, wildlife, and recreational opportunities by evaluating timing and effectiveness of past treatment programs. Recommend early, proactive treatment.
2. Stay updated on waterbody management trends through local and national organizations and regular monthly meetings).
3. Work with Mystic River Watershed Association on pond and watershed issues.
4. * Eradicate invasive weeds (removed 12 water chestnut plants in 2022, found none in 2023. Major effort on phragmites in 2009, recently mapped current phragmites concentrations, also tackling bittersweet and false indigo). Early treatment of Eurasian Milfoil spring of 2023.
5. * Help control excessive algae by means of summertime monitoring.
6. Control erosion of the west shore with plantings (e.g. planted 50 dogwoods during 2022-2023 Trails Days), previously constructed 9 flights of stone steps for fishermen. Brush in erosion sites, cleanup shoreline and banks each Trails Day
7. Enhance water quality by distributing 10,000 flyers throughout to Arlington households in 2022, 2023 and 2024 promoting fertilizers without phosphorus.
8. * Inspect, and occasionally service, outflow structure to ensure steady state water level.
9. Actively assist animal control to maintain a steady waterfowl population. Have assisted wildlife in distress (often entangled in fishing line).
10. Assist abutters with shoreline restoration by promoting best practices. Assisting in NOI preparation where required. MassDOT dredged the sandbar in 2022.
11. Network with Spy Pond stakeholders — Arlington Conservation Commission, Friends of Spy Pond Park, Mystic River Watershed Association, Arlington DPW, Mass. Department of Transportation, and Arlington Land Trust.
12. Present educational talks on pond history and ecology.
13. Research and record dimensions of pond's health with Tufts University.
14. Lobbied Mass Highway for many years (beginning 2002), met with exploratory site engineers to help develop program to remediate the sandbar caused by runoff from Route 2.
15. Represent Spy Pond at Town Day, Ecofest, and other events.
16. Monthly meetings on the first Tuesday at 7:30pm, Town Hall Annex. Small regular group but trying to recruit more.